



US 20100148396A1

(19) **United States**

(12) **Patent Application Publication**

Xie et al.

(10) **Pub. No.: US 2010/0148396 A1**

(43) **Pub. Date: Jun. 17, 2010**

(54) **METHODS OF MAKING ARTICLES HAVING TOUGHENED AND UNTOUGHENED REGIONS**

(75) Inventors: **Ming Xie**, Beavercreek, OH (US);
Donald George Lachapelle,
Cincinnati, OH (US); **Stephen**
Craig Mitchell, West Chester, OH
(US)

Correspondence Address:

GENERAL ELECTRIC COMPANY
GE AVIATION, ONE NEUMANN WAY MD F16
CINCINNATI, OH 45215 (US)

(73) Assignee: **GENERAL ELECTRIC**
COMPANY

(21) Appl. No.: **11/830,874**

(22) Filed: **Jul. 31, 2007**

Related U.S. Application Data

(63) Continuation-in-part of application No. 11/736,319,
filed on Apr. 17, 2007, now abandoned.

Publication Classification

(51) **Int. Cl.**
B29C 45/14 (2006.01)

(52) **U.S. Cl.** **264/259**

(57) **ABSTRACT**

Methods of making an article having at least one toughened region and at least one untoughened region involving providing a material, applying a toughening agent to a portion of the material, shaping the material to produce a preform, applying an untoughened resin to the preform, and curing the preform having the applied untoughened resin to produce the at least one toughened region and the at least one untoughened region wherein the toughened region comprises a toughened resin having a fracture toughness of at least about 1.0 MPa-m^{1/2}.